NASA's Earth Observing System Data and Information System (EOSDIS) and Access to Earth Science Data

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ABSTRACT

The Earth Observing System (EOS) Program is NASA's contribution to the U. S. Global Change Research Program (USGCRP). This program started in 1990, with the selection over 550 science investigators including interdisciplinary scientists and Principal Investigators for various instruments to be flown into Earth orbit. Right from the beginning of the EOS program, considerable attention has been paid to data management and dissemination. As such, the EOS Data and Information System (EOSDIS) has been under development since 1990 at the same time as the spacecraft, instruments and science algorithms for the EOS missions. As the development of EOSDIS was started, the following key goals were established: 1. EOSDIS was to be NASA's Earth science data system, providing access not only to EOS data, but to all of NASA's Earth science data; 2. EOSDIS was to be a distributed system, taking advantage of existing expertise and data holdings at several data centers; 3. EOSDIS was to evolve with changes in technology. The technical requirements for EOSDIS were to: 1. Provide mission systems support (command and control for spacecraft and instruments, ground stations to capture data, and the appropriate networks) for each of the EOS missions; 2. Process the data from each of the EOS missions into a set of standard data products; and 3. Archive and distribute, to a broad user community, NASA's Earth science data products.

The goals and technical requirements of EOSDIS are being met through contracts for the development of two major systems – EOS Data and Operations System (EDOS) and EOSDIS Core System (ECS) – a set of Science Investigator-led Processing Systems (SIPSs) and a set of eight data centers called the Distributed Active Archive Centers (DAACs). The EDOS handles the data capture and initial processing of the large quantities of science data from the EOS instruments. The ECS provides the hardware and software for mission operations and for the processing, archiving and distributing EOS data at the DAACs. The SIPSs are managed by EOS science investigators and used to produce several of their standard products.

The DAACs are the centers through which users access data held by EOSDIS. Each of seven DAACs specializes in certain Earth science discipline areas and the eighth DAAC's focus is on socio-economic data and human interactions in global change. The Earth science disciplines covered by the DAACs include: Land Processes, Sea Ice and Polar Processes, Cryosphere and Climate, Global Biosphere, Hydrology, Ocean

Circulation and Air-Sea Interaction, Upper Atmosphere, Atmospheric Dynamics, Radiation Budget, Clouds, Aerosols and Tropospheric Chemistry, Biogeochemical Dynamics. In addition, EOSDIS has cooperative arrangements with the Global Hydrology Resource Center in Huntsville, AL and the National Oceanographic and Atmospheric Administration's (NOAA) data centers. Also, EOSDIS provides interoperable access to data held at several international data centers. The data can be searched and ordered from the URL http://eos.nasa.gov/imswelcome. A list of the DAACs, cooperating data centers and their contact information may be found at URL http://eos.nasa.gov/daac.

The DAACs have been in operation since 1994 and are currently serving a growing user community of tens of thousands of users providing over 10 Terabytes of data each month. (Causal user access via the World Wide Web exceeds 100,000 per month). There are over 900 different datasets that the DAACs archive, maintain and distribute. These include data from NASA satellite and aircraft programs, in situ data from field experiments, "pathfinder" data resulting from interagency (NASA, NOAA, USGS) collaboration, and data from international satellite programs. Information about current holdings can be found at URL http://spsosun.gsfc.nasa.gov/spso/sdp.

At present, a major focus of EOSDIS is in deploying the system components, integrating, testing and ensuring readiness to support the upcoming satellite missions. Landsat-7 was launched on April 15, 1999. EOSDIS has been supporting the archiving and distribution of the Landsat-7 data since then. After the initial checkout period, Lansdat-7 data has been available to the public since August 23, 1999. EOSDIS is now being prepared to support EOS Terra expected to launch in Fall 1999, to be followed by other EOS missions over the next three years.

NASA is currently supporting a Federation experiment wherein a number of Working Prototype Earth Science Information Partners (WP-ESIPs) are participating in developing new and innovative scientific products and approaches to data management, and in using the technology and NASA's data for "real-world" applications. NASA has an open data policy, with data available to all users at no more than the marginal cost of filling a user's request. Commercial entities are welcome to acquire data from NASA and provide value-added services to the community.